

CLAIMS:

1. A particulate filter, comprising:
a housing; and
a substrate disposed within the housing, the substrate comprising a catalyst composition comprising a single crystalline phase multiple metal oxide comprising platinum, wherein the substrate is designed such that gas flowing through the substrate, passes through a walls in the substrate prior to exiting the substrate.
2. The particulate filter of Claim 1, wherein the multiple metal oxide comprises pyrochlores having the formula $R_2D_2O_7$, wherein R comprises a rare earth element, and D is the Pt.
3. The particulate filter of Claim 2, wherein R is selected from the group consisting of praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, yttrium, scandium, ytterbium, and lutetium.
4. The particulate filter of Claim 1, wherein the multiple metal oxide comprises a perovskite.
5. The particulate filter of Claim 4, wherein the perovskite has the formula, $A_{a-x}B_xMO_b$, wherein A is a mixture of elements in the form of single phase mixed lanthanides, B is a divalent or monovalent cation, M is Pt; a is 1 or 2; b is 3 when a is 1 or b is 4 when a is 2; and x is 0 to 0.7.

6. The particulate filter of Claim 1, wherein the multiple metal oxide further comprises a metal selected from the group consisting of barium, radium, strontium, calcium, magnesium, beryllium, scandium, yttrium, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, sodium, rubidium, and mixtures comprising one or more of the foregoing metals.

7. The particulate filter of Claim 1, wherein the catalyst composition further comprises a metal aluminate.

8. The particulate filter of Claim 7, wherein the metal aluminate further comprises a metal selected from the group consisting of barium, radium, strontium, calcium, magnesium, beryllium, scandium, yttrium, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, sodium, rubidium, and mixtures comprising one or more of the foregoing metals.

9. The particulate filter of Claim 8, wherein the multiple metal oxide is substantially uniformly dispersed in the metal aluminate.

10. The particulate filter of Claim 1, wherein the catalytic metal is loaded on the substrate at about 0.00061 to about 0.031 grams per cubic centimeter.

11. A process for treating diesel soot, comprising:

introducing a gas stream comprising soot to a particulate filter, wherein the particulate filter comprises a housing and a substrate disposed within the housing, wherein the substrate comprising a catalyst composition comprising a single crystalline phase multiple metal oxide comprising platinum;

passing the gas stream through the substrate, wherein the gas stream passes through a wall in the substrate and contacts the catalyst composition prior to exiting the substrate; and

removing soot from the gas stream.

12. The process of Claim 11, wherein the multiple metal oxide further comprises pyrochlores having the formula $R_2D_2O_7$, wherein R comprises a rare earth element, and D is the Pt.

13. The process of Claim 12, wherein R is selected from the group consisting of praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, yttrium, scandium, ytterbium, and lutetium.

14. The process of Claim 11, wherein the multiple metal oxide comprises a perovskite.

15. The process of Claim 14, wherein the perovskite has the formula, $A_{a-x}B_xMO_b$, wherein A is a mixture of elements in the form of single phase mixed lanthanides, B is a divalent or monovalent cation, M is Pt; a is 1 or 2; b is 3 when a is 1 or b is 4 when a is 2; and x is 0 to 0.7.

16. The process of Claim 11, wherein the multiple metal oxide comprises a metal selected from the group consisting of barium, radium, strontium, calcium, magnesium, beryllium, scandium, yttrium, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, sodium, rubidium, and mixtures comprising one or more of the foregoing metals.

17. The process of Claim 11, wherein the catalyst composition further comprises a metal aluminate.

18. The process of Claim 16, wherein the metal aluminate further comprises a metal selected from the group consisting of barium, radium, strontium, calcium, magnesium, beryllium, scandium, yttrium, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, sodium, rubidium, and mixtures comprising one or more of the foregoing metals.

19. The process of Claim 18, wherein the multiple metal oxide is substantially uniformly dispersed in the metal aluminate.

20. The process of Claim 11, further comprising igniting the soot at a temperature of less than or equal to 385°C.

21. The process of Claim 20, wherein the temperature is less than or equal to about 375°C.

22. The process of Claim 21, wherein the temperature is less than or equal to about 365°C.